" defiant yells, they cut and parried at supposed attacks,
" finally throwing down their weapon and taunting the dead
" beast by dancing before it unarmed. This done Inas told
" me the carcase was at my disposal.

" The death of this tiger now establishes the fact of the
" existence of tigers here, for asserting which I have been
" pretty frequently laughed at. However, this is not the Ju-
" gra pest, a brute whose death would be matter for general
" rejoicing, the one now destroyed being a tigress 8 feet long
" and 2 feet 8 inches high."

Breeding Pearls.

[The following paragraphs respecting " Breeding Pearls," extracted from *Land and Water* under the dates annexed to them, may be of interest.]

The glass tube now before me, so kindly provided by Her Highness the Ranee of Sarawak as a test of the credulity of the inhabitants of the British Isles, contains a few genuine seed pearls of the Meleagrina and five small marine shells—Cowries or Cyprœa, sub-genus Trivia of Gray, which represent the rice. The specific distinctions of these small trivia are so minute that this individual species has been from time to time variously described. It is the Cyprœa oryza of Linnœus and of Lamarck; C. intermedia of Kiener; C. insecta of Mighels, and will doubtless receive other designations from daring conchologists, who delight in a religious dissent from the opinions of their predecessors. The so-called rice is a marine shell of the genus Cyprœa, the end or apex of each example carefully filed or ground off to represent the effect of having been fed upon by the pearls. The whole is a deliberate and barefaced imposture, and it is to be hoped that when some generations hence this miserable myth again crops up in the repetitive operations of history, some more powerful pen than mine may find employment in denouncing the shameless attempt to impose upon the credulity of the scientific world.

(Signed) Hugh Owen.

December 25, 1878.

Two or three months ago I saw mention made of them by Major MacNair, R. E, in his work "Perak and the Malays," and some years ago a work on Borneo, Sarawak, &c. made an especial allusion to them. But both authors spoke of the thing rather as a myth. It would be truly worthy work for you and a small council of your friends and brother savants to solve this mystery. Procure another batch of these pearls which are known to experts by their general appearance; lock them up (when in council assembled) for six months or so, and at the end of that term reveal to the public whether the pearls have increased.

(Signed) FRANK BUCKLAND.

November 16, 1878.

Pearls are composed of aggregated minute crystals of carbonate of lime. But we are apparently stumped at the outset, for crystals can only grow in solution, and the conditions in which pearls breed are, "that they be kept in a dry box." However, we must make the best of things as they are. There is always water present in the air as aqueous vapour, varying in quantity according to circumstances; and the extreme limit of that quantity is determined by the temperature. Carbonic acid is also a constant constituent of the air, the normal amount being about 0.4 per cent. by volume; and there are always solid particles of organic and inorganic matter, varying in quantity and quality according to obvious conditions. We are told that it is necessary for the production of new pearls that nutritive material be provided in the shape of grains of rice. Rice like the grains of all cereals, contains lime, chiefly as the phosphate, and to some extent also as the carbonate. As pearls are composed of carbonate of lime it is probable that these earthy salts are the source from which the young ones are formed. As a confirmation of this I may mention that the old book previously alluded to states the Japanese use not rice, but a cheek-varnish prepared from a particular kind of shell. The preference of rice to other grains may be explained by the fact that it is the chief support of the inhabitants of warm countries where breeding pearls are found, and hence is most easily obtained. In the neighbourhood of chalk cliffs or limestone rocks, from the triturating effects of atmospheric agencies, both chemical and physical, the dust floating in the atmosphere is largely composed of carbonate of lime in an excessively fine state of division. It is just possible that similar

causes may operate on the lime salts of the rice included with the breeding pearls, and that so the air may become charged with an infinitesimal quantity of lime dust. During the day the temperature of the air is higher than at night, the range being greatest in tropical latitudes. As before remarked, the quantity of aqueous vapour capable of being held in suspension by the atmosphere varies with the temperature. At 32 degrees Fahrenheit it is about 2 grains to the cubic foot; at 77 degrees Fahrenheit, 10 grains; at 100 degrees Fahreuheit it is about 20 grains. Should the temperature during the night fall below the point of saturation for the vapour contained in the air, the latter is condensed into liquid globules, and dew begins to fall, carrying with it in its descent the floating dust particles. In such a case, within the box containing the pearl there will fall a fine moisture and lime dust, and the pearl will receive its share, becoming coated with a delicate film. Sometimes no such deposit will take place, and sometimes it will be more appreciable than at others, according to the amount of vapour with which the air is charged and the variation in the temperature. During the night the moisture, together with the carbonic acid of the air, will act on the lime particles, dissolving them. Those of the carbonate of lime will enter into solution as the bicarbonate, in exactly the same way as water passing over a calcareous soil acquires the property known as hardness. The phosphate will be partially decomposed by the carbonic acid, and also become dissolved as the bicarbonate. Hence ultimately the pearl is covered with an exceedingly weak solution of the bicarbonate of lime. Next day, with returning heat, the moisture evaporates, the carbonic acid is given off, and carbonate of lime is precipitated in a manner exactly analogous to the way in which stalactites are formed, except, that in the latter the deposit is amorphous, while on the pearl the molecules are induced by the pre-existing crystals to assume a definate polar arrangement which results in crystallisation. The effect of all this would be that a uniform or nearly uniform deposit would take place over the whole of the pearl. But suppose that on its surface there should happen to be a slight irregularity, such as might be caused by the projecting angle of any crystal, the moisture, according to the laws of the surface-tension of a fluid, will run together, and cling around the prominence. (This is simply illustrated by spilling a little water on a plate, and introducing a pellet into its midst, when the water will be seen to be heaped up round the pellet.

Hence, when the moisture evaporates, a greater deposit will take place at this spot than any other part of the pearl, and the irregularity will be gradually increased. In process of time a nodule will appear, formed of minute crystals grouped in a spherical form, which is the figure of the equilibrium that any aggregate of unite tends to assume under the influence of mutual attraction, and supported on a slender pedicle. As the sphericle increases in size, the force of gravity overcomes the cohesion of the pedicle, and a little pearl lies alongside the old one. Consecutive deposits will continue to be made on its surface, causing it to grow gradually larger. But as the surface of a sphere only increases as the square of its diameter, while the mass increases by the cube, the growth of the pearl will be most rapid when it is small, and the additions made to its bulk more imperceptible the larger it gets. And so we are told it takes three years for a new pearl to be formed, but forty years for it to attain "the size that jewellers generally set, three in a ring." Such an hypothesis must be taken for what it is worth. My object is not so much to offer a solution of the problem, as to indicate that, through the operation of natural causes, of which, possibly, science is ignorant, it may be that pearls proliferate in the manner that is alleged.

(Sd.) W. M.

4th January, 1879.

The Maritime Code and Sir S. Raffles.

(See Paper at page 52.)

In the Weekly Register, a newspaper fomerly published in Malacca, there appeared in the year 1840, a translation of the Malay Code, with some remarks on Malay Codes, and on the aboriginal tribes of the Peninsula, and with translations of two Malay Manuscripts, one regarding the Menangkabau in Johor, the other relating to the first arrival of the Portuguese in Malacca.

This Series of papers was begun on the 9th January, 1840, and was completed on the 3rd September of the same year.

The name of the translator is not given, but the paper is described as "an original fragment of an unpublished manuscript."